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METHODS, SYSTEMS, AND DEVICES FOR SAVING NATURAL RESOURCES USABLE IN A BUILDING STRUCTURE

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METHODS, SYSTEMS, AND DEVICES FOR SAVING NATURAL RESOURCES USABLE IN A BUILDING STRUCTURE

BACKGROUND OF THE INVENTION

1. The Field of the Invention

[001] The present invention generally relates to methods, systems, and devices for saving natural resources. More specifically, the present invention generally relates to substituting mechanical and electromechanical devices and systems for waste disposal systems that traditionally use water is a carrier medium.

2. The Relevant Technology

[002] In recent years there has been an attempt to protect and preserve natural resources, while accommodating changes in city, state, and country populations. The quantity of natural resources is limited, while the demand for such natural resources continues to increase at a dramatic rate. There is a tension between the need to use natural resources for, say, eating, drink, heating, etc, while protecting or controlling the quantity of resources used. Illustratively, there is a tension between the need to develop land for an increasing population base and protecting natural forests and wet lands. Further, there is a tension between generating new fuel sources and adversely affecting pristine land.

[003] In addition to protecting the natural resources associated with land and fuel sources, such as wood, oil, gas, and coal, there is a need to preserve water resources. With an exploding world population, available water resources are being overextended. Existing technologies are incapable of reducing the quantity of water used for every day living. Waste of consumable water occurs because of antiquated water systems that

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lose water or use water in an efficient manner. For instance, many existing water supply lines leak allowing significant quantities of culinary water to seep into ground surround the water line.

[004] In addition to losing and wasting water through antiquated supply infrastructure, modern toilets inefficiently use water. Currently, water is the primary carrier for removing bio-waste. Toilets remove human waste, while use of sinks, drains, and faucets facilitates removal of animal waste. For many years, a significant quantity of water was wasted through use of inefficient toilets that used excessive quantities of water to "flush" bio-waste material using a toilet. In recent years, and resulting by Government action, there has been a reduction in the amount of water used to flush bio-waste material. Although this preserves some natural resources, still more must be done to alleviate the strain exerted on existing water supplies.

[005] In addition to the problems with preserving water resources, other problems arise with providing electricity to home, factories, etc. With the escalating cost for natural resources, such as gas and oil, the cost for treating wastewater continues to increase. Further, the increasing demand for electricity drives the cost for building and maintaining the electricity infrastructure upward. When available electricity falls below the needed supply, blackouts become the norm. These blackouts cost the nation significant amounts of money and productive time.

[006] Needed are methods, systems, and devices that alleviate the need for water as the primary source for removing bio-waste, and by so doing aid with preserving natural resources. Additionally, needed are methods, system, and devices that can facilitate conversion of bio-waste material into an energy resource.

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BRIEF SUMMARY OF THE INVENTION

[007] The present invention provides methods, systems, and devices that alleviate the need for water as the primary carrier for removing bio-waste, and by so doing aid with preserving natural resources. Additionally, the present invention provides methods, system, and devices that can facilitate conversion of bio-waste material into an energy resource.

[008] In one embodiment of the present invention, methods, systems, and devices are provided that save natural resources through substituting mechanical and electrical-mechanical devices and systems for water as a carrier medium for removing bio-waste materials. Through using a network of collection receptacles associated with a physical structure, such as a home, office, warehouse, or other physical structure. The collection receptacles receive bio-waste material, while removal of the bio-waste material occurs through a transport network. This transport network includes various tunnels, chambers, etc. Through the network moves mechanical or electro-mechanical devices that automatically collect and package bio-waste material deposited in the collection receptacle. These devices deliver the packaged material to a storage container.

[009] According to another aspect of the present invention, provided are methods, systems, and devices that utilize collected and packaged bio-waste material as a fuel source. Homes, factories, or other building structures can include a dedicated recycle system that burns the bio-waste material, converting the bio-waste material into electricity usable by the home, factor, or other building structure. Alternatively, collected or packaged bio-waste material can be transported to one or more centrally located recycle facilitates that burn the bio-waste material, again creating electricity.

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[010] These and other objects and features of the present invention will become more fully apparent from the following description and appended claims, or can be learned by the practice of the invention as set forth hereinafter.

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BRIEF DESCRIPTION OF THE DRAWINGS

[011] To further clarify the above and other advantages and features of the present invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

[012] Figure 1 illustrates a schematic representation of an exemplary system of the present invention.

[013] Figure 2 illustrates a schematic partial cross-sectional perspective representation of an exemplary building structure of the exemplary system of Figure 1, with associated collection receptacles, carts, network, and local storage according to one configuration of the present invention.

[014] Figure 3 illustrates a perspective view of an exemplary collection receptacle of the exemplary building structure of the exemplary system of Figure 1 according to one configuration of the present invention.

[015] Figure 4 illustrates a cross-sectional view of an exemplary collection receptacle of the exemplary building structure of the exemplary system of Figure 1 according to one configuration of the present invention.

[016] Figure 5 illustrates a perspective view of an exemplary liner for the exemplary collection receptacles of Figures 3 and 4 according to one configuration of the present invention.

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[017] Figure 6 illustrates a perspective view of another exemplary collection receptacle of the exemplary building structure of the exemplary system of Figure 1 according to one configuration of the present invention.

[018] Figure 7 illustrates a cross-sectional view of the exemplary collection receptacle illustrated in Figure 6 according to one configuration of the present invention.

[019] Figure 8 illustrates a cross-sectional view of the exemplary collection receptacle illustrated in Figure 6 according to one configuration of the present invention.

[020] Figure 9 illustrates a side view of another exemplary collection receptacle of the exemplary building structure of the exemplary system of Figure 1 according to one configuration of the present invention.

[021] Figure 10 illustrates a schematic partial cross-sectional side view representation of an exemplary building structure of the exemplary system of Figure 1, with associated collection receptacles, carts, network, and local storage according to one configuration of the present invention.

[022] Figure 11 illustrates a side view of an exemplary cart of the exemplary building structure of the exemplary system of Figure 1 according to one configuration of the present invention.

[023] Figure 12 illustrates a schematic partial cross-sectional side view representation of an exemplary building structure of the exemplary system of Figure 1, with associated collection receptacles, carts, network, and local storage according to one configuration of the present invention.

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[024] Figure 13 illustrates a side view of an exemplary cart of the exemplary building structure of the exemplary system of Figure 1 according to one configuration of the present invention.

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DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[025] The present invention overcomes many of the problems associated with existing bio-waste systems. Specifically, the present invention utilizes a technology that improves health and sanitation for humans and animals, by reducing handling of bio-waste material and hence reducing possible contamination, creation, and harboring of disease-producing bacteria, germs, and viruses, produced by mixing water and waste material. Further, the present invention reduces the expense for treatment of such waste water and reduces the cost and maintenance for upgrading the existing networks that transport waste water to various treatment facilities.

[026] The present invention described herein relates to systems, methods, and devices associated with using machines as the carrier of bio-waste or bio-solids in dwellings, homes, houses, buildings, or any other structure that bio-waste or bio-solids are created and removal of deposits is required for sanitation. In this manner, the systems, methods, and devices replace water as the carrier of bio-waste, thereby saving natural water resources. Further, the present invention relates to utilizing the collected bio-waste material as a fuel source to supplement and, in some cases, substitute for existing natural resources, such as wood, coal, oil, and gas. By so doing, the present invention provides additional resources rather than eliminating or reducing the available natural resources.

[027] Referring now to Figure 1, depicted is a schematic representation of an exemplary system of the present invention designated by reference numeral 10. The system 10 includes one or more building structures 12 that are remote from a remote recycling facility 14 where collected bio-waste is converted into electrical power, such as by burning or other manner of obtaining energy from the collected bio-waste. The

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use of the term "recycle facility" includes other facilities such as, but not, treatment plants, bio-gas plants, or other facilities that can use the collected bio-waste.

[028] Building structures 12 communicates with the remote recycling facility by way of a transportation network 16. This transportation network 16 accommodates vehicles, trains, or other conveyances capable of carrying bio-waste from building structures 12 to recycle facility 14. For instance, transportation network 16 can include existing or customized roads, rails, tunnels, waterways, combination thereof, or other structures that facilitate collection and delivery of bio-waste material.

[029] Optionally, system 10 can include a control center 18 in signal communication with building structures 12, recycle facility 14, and/or such vehicles, trains, or other conveyances moving along transportation network 16. This control center 18 delivers signals carried by electromagnetic waves, such as microwaves or radio waves, to building structures 12, recycle facility 14, and/or the vehicles using transportation network 16 to control the collection, packaging, and/or recycling of bio-waste material. Analysis of signals received from building structures 12, recycle facility 14, and/or the vehicles using transportation network 16 enables computers, including hardware and/or software modules and components, and individuals at control center 18 to manage bio-waste collection, transportation, and recycling. One skilled in the art will appreciate that each building structure 12, recycle facility 14, and/or vehicle using transportation network 16 can include appropriate transmitter and receiver capable of receiving the desired signals. Further, each building structure 12, recycle facility 14, and/or vehicle using transportation network 16 can include global positioning technology for use in pinpointing the location of the same.

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[030] The individuals using building structures 12, whether it is a factory, home, office, etc, generate quantities of bio-waste, such as from cooking, cleaning, urinating, defecating, or other manner of creating bio-waste. To reduce the quantity of water used to remove this bio-waste from building structures 12, system 10 uses waterless collection devices to collect and package bio-waste instead of water.

[031] Each building structure 12 includes one or more waterless collection receptacles 20, a network 22 for transporting the bio-waste collected from collection receptacles 20, and a local storage 24 for bio-waste collected and packaged at the particular building structure. Optionally, each building structure 12 can include a local recycle facility 26 that can use the bio-waste for powering the particular building structure generating the collected bio-waste. For instance, local recycle facility 26 can be a smaller version of remote recycle facility 14 that burns the bio-waste to create electrical power for the building structure generating the bio-waste.

[032] Additionally, each building structure 12 can include a local control center 28 that governs the collection of bio-waste at the specific building structure. This local control center 28 can include hardware and software modules and components to control movement of the collection devices and motorized carts to collect and package bio-waste instead of water. The local control center 28 manages operation of local recycle 26 and can make requests to control center 18 for pick-up of collected bio-waste. These communications and requests can be made using any type of telecommunication network, including wireless, microwave, radio frequency, fiber optic, combinations thereof, or other telecommunication technology that enables transmitting and receiving, collectively transceiving, of signals.

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[033] The transportation network 16 associated with system 10 is used to carry the collected and packaged bio-waste to remote recycle facility 14. Vehicles can periodically visit each building structure 12 and gather the collected and packaged bio-waste. These vehicles can transport the bio-waste to remote recycle facility 14 where it is converted to electrical energy, such as by burning. This network 16 can include roads, rails, tunnels, or other transport infrastructure to carry the bio-waste. Each vehicle (not shown) can include sensors and receivers to intercept signals from control center 18 that controls the collection of bio-waste material. These vehicles can be automatically controlled by control center 18 or manually controlled by the operator of the vehicle upon receiving instructions from control center 18.

[034] With reference to Figure 2, depicted is a schematic representation of an exemplary building structure 12. To reduce the quantity of water used to remove bio-waste from building structure 12, building structure 12 includes one or more collection receptacles 20 that receive the bio-waste. One or more electromechanical carts 30 collect bio-waste from these collection receptacles 20. This is in contrast to traditional or existing buildings where flowing water carries the bio-waste.

[035] Carts 30 move within a local network 22 within building structure 12. The local network 22 includes one or more shafts, tunnels, channels, chutes, pipes, or tubes, termed herein individually a "transport member" and collectively "transport members". These transport members crisscross the interior of building structure 12 and provide a path for carts 30 to collect bio-waste, and following packaging of the bio-waste material into fuel blocks, transport the bio-waste to a local storage 24 for short-term or long-term storage.

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[036] Referring now to Figures 3 and 4, illustrated is an exemplary collection receptacle 20 according to one embodiment of the present invention. This collection receptacle 20 collects bio-waste directly from the occupants of building structure 12, such as when an occupant urinates or defecates. Other collection receptacles can collect bio-waste indirectly or directly from occupants of building structure 12. For instance, other collection receptacles can collect wastewater or other bio-waste from waste disposal sinks or other similar structures within building structures 12.

[037] Collection receptacle 20 can have the form of a chair or stool similar to existing toilets. However, collection receptacle 20 eliminates the need for water as a carrier of the bio-waste collected through collection receptacle 20. Collection receptacle 20 has a main body 40 with a reservoir 42 mounted thereto. The main body 40 has a lower portion 44 adapted for attachment to a floor or generally horizontal surface upon which collection receptacle 20 is to rest.

[038] As shown in Figure 4, an upper portion 46 of main body 40 includes a lip 48 that supports a seat 50. Disposed between upper portion 46 and lower portion 44 is a drawer 45 that is slidably received within a chamber 52 that receives the bio-waste material. The drawer 45 includes a lip 47 that cooperates with a liner 54 dispensed to a user from a liner dispenser 56, as will be discussed in more detail hereinafter. The drawer 45 is mounted on two sliders 49, only one being illustrated in Figure 4, which is in turn mounted to main body 40. Each slider 49 can be any rail-type slider that allows movement of one structure relative to another. For instance, slider 49 can include a rail mounted to main body 40 that cooperates with a rail mounted to drawer 45, one or both of that rails including bearings, rollers, or wheels to reduce friction between the rails and enable movement one to another. One skilled in the art can identify various other

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configurations or mechanisms to facilitate movement of drawer 45 relative to main body 40.

[039] The liner 54, as shown in Figure 5, has an open end 60 that cooperates with lip 47 of collection receptacle, while a closed end 62 locates within chamber 52. A user can remove liner 54 from liner dispenser 56 and mount the same to lip 47 of upper portion 46. This liner 54 releasably contacts lip 47 by way of an elasticated portion 64 that releasably surrounds a portion of lip 47 of drawer 45. In another configuration, liner 54 includes, optionally in addition to elasticated portion 64, a layer of releasable adhesive that attaches to lip 47 of drawer 45 so that a portion of liner 54 extends into chamber 52. In still another configuration, liner 54 releasably contact lip 47 of drawer 45 through the forces of friction or static electricity, optionally in addition to elasticated portion 64 coupling liner 54 to lip 47 of drawer 45. In still another configuration, liner 54 includes an elastic snap ring that cooperates with lip 47 of drawer 45. In still another configuration, liner 54 includes press-on seal plastic portions that couple liner 54 to lip 47 of drawer 45. In still another configuration, liner 54 and/or lip 47 of drawer 45 include one or more adhesive spots, tabs, or tapes that couple liner 54 to lip 47 of drawer 45.

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[040] Liner 54 securely collects any bio-waste material deposited therein and prevents a portion of the bio-waste material escaping from liner 54. To aid with this, liner 54 includes drawstring 66 close to open end 60 that facilitates closing of liner 54. A user manually operates drawstring 66 to close open end 60 of liner 54. Manual operation of drawstring 66 occurs, either directly or indirectly, by way of intervening levers, gears, linkages, mechanical or electromechanical components, combination thereof, or other manners by which movement of a user initiates movement of

drawstring 66. Optionally, moving drawstring 66 to close open end 60 releases the contact between liner 54 and lip 47 of drawer 45, thereby enabling liner 54 drop into an awaiting cart or storage receptacle from which the cart removes the bio-waste.

[041] Generally, liner 54 can be fabricated from synthetic materials, natural materials, combinations of synthetic and natural materials. More specifically, liner 54 can be made from paper, plant material, wood, composites, cloth, plastics, polymers, or other materials. Additionally, liner 54 can be coated or receive an absorbent material that causes liquids deposited into liner 54 to become a gel. For instance, colloids, hygroscopic chemicals, bio-polymers, cationic dry polymer, combinations thereof, or other materials that can absorb a liquid. The liner 54, alone or in combination with an absorbent material deposited within liner 54, absorbs gases and neutralizes odors of the collected bio-waste material. This can be achieved by an absorbent material that congeals and deodorizes liquids, such as but not limited to, bodily fluids.

[042] Returning to Figure 4, reservoir 42 includes a hole 70 that cooperates with chamber 52. An interior chamber 72 of reservoir 42 communicates with hole 70. This interior chamber 72 holds an absorbent material 74 that can be deposited into liner 54 prior to collection of bio-waste material. This absorbent material 74 can be deposited within interior chamber 72 through a top of reservoir 42, such as by removing a lid 76 thereof. Alternatively, absorbent material 74 can flow into interior chamber 72 through a fill hole 78 and associated piping, illustrated by dotted lines, such as blown into interior chamber 72 using appropriated fans, fiber moving equipment, etc.

[043] The absorbent material 74 can be any material that will absorb fluids deposited within liner 54. These materials can include, but are not limited to, fibrous materials that have been shredded, ground, chopped, and/or pulped into small pieces

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before being blown into interior chamber 72. Exemplary materials include, but are not limited to, paper, plant materials, plastic, composite wood, composite plastics, clay, sand, shells, earth, stone, cloth, bee wax, animal bi-products, solidifying chemicals (gels), odor neutralizers, gas modifiers, deodorants or air fresheners, natural and chemical preservatives, modified non-combustible composite materials that have a reduced potential of spontaneous combustion, recycled cellulose fibers, organic plant waste, grass clippings, leaves, weeds, seeds, wood, bark, shavings, needles, chips, sawdust, ground corncobs, shredded stover, stocks, and cornstarch, straw, flax, oat, wheat, chopped hay, shells, husks of coca, peanut, cottonseed, oats, chia seeds, combinations thereof, or other material that can absorb fluids associated with the collected bio-waste.

[044] This absorbent material 74 can be directed into hole 70 through the forces of gravity and use of a guide member 80. Alternatively, feed screws, rams, plungers, spinning spindle wheels, or other mechanical or electro-mechanical devices can be used to direct a quantity of absorbent material 74 into liner 54. Lever 86 (Figure 3) connects to guide member 80 through a linkage (not shown) so that moving lever 86 (Figure 3) in the direction of arrow A moves guide member 80 in the direction of arrow B to allow a quantity of absorbent material 74 to pass into liner 54, as illustrated by arrow C, prior to or following depositing of the bio waste into liner 54. In this manner, the user can deposit any quantity of absorbent material into liner 54. By moving lever 86 in the opposite direction, guide member 80 moves to prevent passage of absorbent material 74 into liner 54.

[045] In addition to the configuration described herein, one skilled in the art will appreciate that various other manners by which liner 54 locates within chamber 52 and

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cooperates with lip 47, or some other portion of main body 40. Similarly, there can be various other mechanisms to deposit absorbent material 74 within liner 54. With reference to Figures 6-8, illustrated is another exemplary configuration of a collection receptacle, identified by reference numeral 120. This collection receptacle 120 collects bio-waste directly from the occupants of building structure 12 (Figure 1), such as when an occupant urinates or defecates, in a similar manner to collection receptacle 20. The discussion of collection receptacle 20 applies to the following discussion with respect to collection receptacle 120.

[046] With reference to Figure 6, collection receptacle 120 has a main body 140 with a reservoir 142 mounted thereto. The main body 140 has a lower portion 144 adapted for attachment to a floor or generally horizontal surface upon which collection receptacle 120 is to rest. An upper portion 146 of main body 140 includes a lip 148 that supports a seat 150 that is omitted from Figure 6 to aid with explanation, but shown in Figures 7 and 8. Extending from an opening in upper portion 146 to an opening in lower portion 144 is a chamber 152 that receives the bio-waste material. Additionally, chamber 152 receives a liner 154 from a liner dispenser 156. This liner 154 cooperates with seat 150 and interior chamber 152 and provides a container for bio-waste material.

[047] Formed in lip 148 or upper portion 146 are grooves 160. Grooves 160 receive a portion of seat 150 (Figure 7) to enable seat 150 to move relative to reservoir 142. More specifically, seat 150 (Figure 7) includes a number of rollers 162 that slide along groove 160. Moving seat 150 relative to reservoir 142 allows a user to position the opening in seat 150 below hole 70 to receive absorbent material 74. The grooves 160 can include recesses 164 within which locate rollers 162 when seat 150 is in the desired location beneath reservoir 142. The rollers 162 also provide a pivot point about

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which seat 150 can pivot to allow seat 150 to receive liner 154 from liner dispenser 156, as shown in Figure 8. The seat 150 pivots about the rearmost roller 162 to allow seat 150 to contact liner 154. With liner 154 having one or more adhesive tabs or an elasticated portion, pivoting seat 150 about an axis of roller 162 results in a top, sides, and/or bottom of seat 150 into contact with liner 154. The adhesive tabs or elasticated portion remains in contact with seat 150 as a user pivots seat 150 toward lip 148 or main body 140 so that liner 154 extends into chamber 152.

[048] It will be understood by those skilled in the art in light of the teaching contained herein, that the seat can move relative to the reservoir using various other manners. For instance, rollers can be formed in upper portion 146 or lip 148, with the grooves and recesses being formed in the seat. In other configuration, biased members, such as springs or other biased structures, can aid with moving the seat relative to the reservoir.

[049] As mentioned above, chamber 152 receives liner 154 from liner dispenser 156 mounted to main body 140, reservoir 142, or some other structure in close proximity to the location of collection receptacle 120. The liner 154 can have a similar configuration to that of liner 54, as illustrated in Figure 5. With continued reference to Figure 7, open end 60 cooperates with seat 150 or main body 140 of collection receptacle, while closed end 62 locates within chamber 152. Instead of coupling liner 154 to seat 150 as described above, a user can remove liner 154 from liner dispenser 156 and mount the same to seat 150. In still another configuration, liner 154 releasably contacts seat 150 or main body 140 through the forces of friction or static electricity, optionally in addition to elasticated portion 64 (Figure 5) coupling liner 154 to seat 150 when seat 150 is pivoted toward liner dispenser 156. In still another configuration, liner

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154 includes an elastic snap ring that cooperates with seat 150. In still another configuration, liner 154 includes press-on seal plastic portions that couple liner 154 to seat 150. In still another configuration, liner 154 and/or seat 150 include one or more adhesive spots, tabs, or tapes that couple liner 154 to seat 150.

[050] In addition to the configuration described herein, one skilled in the art will appreciate that various other manners by which liner 154 locates within chamber 152 and cooperates with seat 150 or main body 140. For instance, in another configuration, liner dispenser 156 moves manually or automatically toward seat 150 or main body 140 to deposit liner 154. The liner dispenser 156 pivots relative to a portion of main body 140 and/or reservoir 142 so that moving liner dispenser 156 toward seat 150 or main body 140 releases liner 154. Movement of liner dispenser 156 relative to reservoir 142 or seat 150 relative to reservoir 142 can occur through any of a number of mechanical or electro-mechanical devices, such as motors, gears, pneumatics, hydraulics, or other manners known to one skilled in the art, and sensor that sense the motion of an individual.

[051] In another configuration, collection receptacle 20 or collection receptacle 120 can deliver a predetermined quantity of absorbent material 74. With reference to Figure 9, a collection receptacle 180 can have a similar configuration to collection receptacle 20 or 120. Instead of including guide member 80 (Figure 3) that moves under the influence of lever 86 (Figure 3), collection receptacle 180 includes a delivery mechanism 186. The delivery mechanism 186 in cooperation with lever 86 deliver the predetermined quantity of absorbent material 74.

[052] Referring now to Figure 10, delivery mechanism 186 includes a shaft 190 mounted to lever 86 and supported by reservoir 42. The shaft 190 has an elongate

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configuration and cooperates with lever 86 such that movement of lever 86 causes shaft 190 to rotate. To achieve this engagement, shaft 190 can have complementary configuration to a hole 192 of lever 86. For instance, shaft 190 can have a cylindrical configuration to cooperate with a cylindrical hole 192. Alternatively, shaft 190 can have a square or other polygonal configuration to cooperate with a square or other polygonal hole. In this later case, the configuration of shaft 190 and hole 192 aid with causing a driving engagement between shaft 190 and hole 192.

[053] To control the movement of shaft 190 and lever 86, shaft 190 includes a stop 191, while a spring 193 mounts to shaft 190 and connects to a portion of reservoir 42. Stop 191 prevent over-rotation of shaft 190 as it engages with a complementary stop 195 mounted to reservoir 42. The spring 193 returns lever 86 to an initial starting position following movement of lever 86 until stops 191 and 195 engage; resulting in the release a quantity of absorbent material 74. The spring 193 can also limit movement of lever 86 during use of collection receptacle 120 by providing a resistance force to over rotation of lever 86. Although spring 193 and stops 191 and 195 are one manner of controlling the movement of lever 86, one skilled in the art can identify various other manners.

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[054] Fixed to shaft 190 is a toothed member 194. The toothed member 194 has a body 200 with a plurality of teeth 202 extending therefrom. A hole 204 passes through body 200 and accommodates shaft 190. Hole 204 can have a similar configuration to hole 192, such that rotation of shaft 190 under the influence of lever 86 causes rotation of toothed member 194.

[055] Cooperating with toothed member 194 and shaft 190 is a spindle assembly 210 that rotates about shaft 190 to move absorbent material 74 from interior chamber 72

to liner 54. Spindle assembly 210 includes a hub 212 from which extends one or more paddles 214 that have generally flexible or substantially rigid cup-type structures 219 that receive a quantity of absorbent material 74 (Figure 9). As spindle assembly 210 rotates about shaft 190, paddles 214 deposit absorbent material 74 held by one or more of cup-type structures 219 into liner 54 (Figure 9). Alternatively, as spindle assembly 210 rotates about shaft 190, paddles 214 deposit absorbent material 74 held between one or more adjacent paddles 214 into liner 54 (Figure 9).

[056] To aid with moving spindle assembly 210 relative to shaft 190, a portion of hub 212 cooperates with a toothed member 194 under the influence of spring 218. In the exemplary configuration, the portion of hub 212 includes a plurality of teeth 216 that are complementary to teeth 202 of toothed member 194. These teeth 202 and 216 engage as spring 218 is constrained by stop 220 and hub 212. As spring 218 attempts to expand, spring 218 forces hub 212 toward toothed member 194 so that teeth 202 and 216 engage. This engagement allows toothed member 194 to force hub 212 to move when shaft 190 rotates in a first direction. When shaft 190 moves in a second direction opposite to the first direction teeth 202 slide over the ramped portion of teeth 216 without causing hub 212 to rotate. By so doing, toothed member 194 causes selective movement of hub 212 and spindle assembly 210.

[057] The teeth 202 and 216 can have various other configurations known to one skilled in the art. Through varying the configuration of teeth 202 and 216, different quantities of absorbent material 74 can be deposited into liner 54 (Figure 9). Teeth 202 and 216 can have lengths or spacing so that moving lever 86 until stops 191 and 195 engage causes one or more cup-type structures 219 to deposit absorbent material 74 into liner 54. For one defined movement of shaft 190 and lever 86, such as until stop 195

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prevents further rotation of shaft 190, hub 212 rotates sufficiently to deposit absorbent material 74 (Figure 9) from one or more cup-type structures 219 or from one or more regions disposed between adjacent paddles.

[058] In still another configuration, the quantity of absorbent material 74 deposited into liner 54 can be controlled by a series of moveable members (not shown) that slide relative one to another upon moving lever 86. A sub-chamber formed between the two moveable members; an upper moveable member that communicates with chamber 72 and a lower moveable member that communicates with hole 70 and/or chamber 52, holds a predetermined quantity of absorbent material 74. Moving the lower moveable member through moving lever 86 in the direction of arrow A releases absorbent material 74 disposed in the sub-chamber into liner 54, while closing the lower movable member and opening the upper moveable member by movement of lever 86 in a direction opposite to arrow A following movement of lever 86 in the direction of arrow A releases a quantity of absorbent material into the sub-chamber.

[059] As described herein lever 86 can function to open and close the moveable members. Optionally, moving lever 86 moves drawstring 66 to close liner 54. It will be appreciated, however, that one or more levers can be used to perform the described functions. Further, it will be understood that various linkages, gears, cams, biased members, springs, and other similar structures can be associated with the lever and moveable member to facilitate the desired movement thereof. For instance, moving lever 86 in a first direction can open the lower moveable member, while moving lever 86 in a second direction opposite to the first direction allows lower movable member to close, the upper movable member to open, and the drawstring to the drawn.

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[060] Reference is made herein to collection receptacle 20 being fixed, such as a toilet within a building structure. It is anticipated, however, that collection receptacle 20 can be movable. Figure 11 illustrates an exemplary moveable collection receptacle 220. This collection receptacle 220 is stored at a storage location, such as a closet or some other location of building structure 12. Upon receipt of signal from a user of building structure 12 requesting bio-waste collection, moveable collection receptacle 220 moves from the storage location to the requesting user. This can be accomplished as control center 18 and/or local control center 28, in Figure 1, uses global positioning system (GPS) technology and/or combination of various sensors and hardware and software components and devices included in building structure 12 and/or moveable collection receptacle 220 to deliver control signals that direct movement of receptacle 220. For instance, control center 18 (Figure 1) can receive a signal indicative of a request for collection receptacle 220; the control center 18 (Figure 1) subsequently delivering control signals to local control center 28 (Figure 1) or directly to moveable collection receptacle 220 to initiate motion of collection receptacle 220 to the desired location. The GPs technology and/or various sensors and hardware and software components and devices can be used to track and control the movement of moveable collection receptacle 220. Following bio-waste collection, moveable collection receptacle 200 returns to the storage location to deposit the liner into collection cart 30 within local network 22 (Figure 1).

[061] The moveable collection receptacle 220 can include one or more wheels 222 that enable movement of the collection receptacle, a holding tank 224 that receives the liner and collected bio-waste, and one or more arms 226 that support the user of the collection receptacle. Further, movable collection receptacle 220 can include a motor

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228, such as, but not limited to, an electric motor, that moves wheels 222 under the direction of control components, indicated by reference number 230. The control components 230 include, but are not limited to, various sensors, computers, and other hardware and software components and modules, which detect electromagnetic wave signals delivered to collection receptacle 220, sense the operation of collection receptacle 220, and control the movement of collection receptacle 220 within building structure 12. This enables collection receptacle 220 to be programmed to move to a desired room or location of building structure 12 (Figure 1) upon receiving a signal from an individual within building structure 12 (Figure 1).

[062] With reference to Figure 12, building structure 12 includes transportation network 22. The transportation network 22 includes one or more shafts, tunnels, channels, chutes, pipes, or tubes, individually a transport member and collectively transport members, that intersect and form a path through which one or more carts 30 can traverse. Additionally, network 22 includes one or more clean-out shafts or access shafts for those carts 30 that function as repair and cleaning carts. These transport members and clean-out shafts can be incorporated into the framework of building structure 12, either within an interior of or part of an exterior of building structure 12.

[063] Disposed within or forming part of network 22 can be moveable or stationary tracks, rails, cables, chains, belts, pneumatic systems, hydraulic systems, or other structures that aid with moving carts 30 through network 22. For instance, one or more carts 30 can have gears that mate with a movable track associated with the transport members so that movement of the track causes movement of the one or more carts 30. When movable or stationary tracks, rails, cables, chains, belts, pneumatic systems, Hydraulic systems, or other structures are used, network 22 can also include

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one or more motors, such as, but not limited to, electric motors, that operate the tracks, rails, cables, chains, belts, pneumatic hoses, hydraulic hoses , or other structures.

[064] The network includes one or more stops 34 in close proximity to those vertical or generally declining transport members of network 22. These stops 34 prevent carts 30 from falling down such transport members, while optionally actuating carts 30 to deposit the collected bio-waste into such transport members.

[065] The carts 30 used with network 22 can have various configurations, one of which is depicted in Figure 13. As shown, cart 30 includes a base 240 that supports a body 242 having an interior compartment 244 that receives liner 54 (Figure 2) and collected bio-waste. The body 242 is pivotally mounted to base 240 at a pivot point 246. The base 240 includes a motor 248 that powers wheels 250 under the control of hardware and software components (not shown) enabling cart 30 to move through transportation network 22 (Figure 1). The motor 248 can include one or more electric motors, hydraulic systems, and/or pneumatic systems powered by batteries, solar cells, electrical connections with the electrical network of building structure 12 (Figure 1), combinations thereof, or other manners of powering electric motors, hydraulic systems, and/or pneumatic systems. Motor 248 can also power an actuator 252 that causes body 242 to pivot relative to base 240 when cart 30 deposits the collected bio-waste into a transport member upon encountering stop 34 (Figure 12). Furthermore, motor 248 can power one or more doors 254 pivotally attached to body 242 that close or seal compartment 244 when bio-waste is deposited therein. These doors 254 in combination with compartment 244, compact the bio-waste to form a bio-waste block or cube of bio-waste material.

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[066] Cart 30 is exemplary of one type of cart moveable within transportation network. The present invention further contemplates the use of services carts that can move along clean-out shafts to repair transportation network 22 (Figure 1) and optionally retrieve damaged or inoperable carts. These service carts can include video equipments or cameras to aid with positioning the service carts and enable an operator to visualize problems with any carts or transportation network 22 (Figure 1). Further, these service carts can include cutting tools, arms and grabbers, cable tethers, or other structures to aid with retrieving inoperable carts and/or repair damaged portions of transport network 22 (Figure 1).

[067] As mentioned previously, and with reference to Figure 12, carts 30 transport the packaged bio-waste material to local storage 24. This local storage 24 can include one or more storage devices 36 that prepare the bio-waste material for long-term or short-term storage. The storage devices 36 can be manually operated by one or more users of building structure 12 or can automatically receive and process the collected bio-waste. Illustratively, storage devices 36 can include, but are not limited to, freezing devices, ozone treating devices, washing and sanitizing equipment, vacuum sealing device, such as, but not limited to, a plastic bag vacuum sealing device, or other devices or equipment that aids with preparing the bio-waste material for long-term or short-term storage. For instance, upon delivering the bio-waste material to local storage 24, storage device 36 can freeze the bio-waste material to enable storage of the same within a refrigerated area of local storage 24. In another configuration, upon delivering the bio-waste material to local storage 24, storage device 36 can vacuum seal the bio-waste material within a plastic container to enable storage of the same within local storage 24.

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Those skilled in the art know various manners and mechanisms to perform such functions.

[068] Generally, the present invention provides mechanisms for collection, storing and optionally recycling bio-waste material produced in a building structure. The present invention provides mechanisms for transporting locally produced bio-waste material to a remote recycle facility that uses the bio-waste material as a fuel source. By so doing, methods, systems, and devices of the present invention alleviate the need for water as the primary carrier for removing bio-waste and preserve natural resources. Additionally, the present invention provides methods, system, and devices that can facilitate conversion of bio-waste material into an energy resource.

[069] The present invention can be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

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